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tion of the *Origin of Species*, we still congratulate Mr. Darwin on having such an admirer. We also hope that such a man as Captain Burton will not be long allowed to remain buried at Fernando Po. He would be far more useful in England, assisting in training officers, travellers, and anthropologists, to be able to fulfil their respective duties as travellers and observers.

OWEN ON THE LIMBS OF THE GORILLA.*

THE first monograph of the present series of osteological comparisons of the bony framework of the anthropoïd apes with that of man was published in 1835 * Professor Huxley† terms it "a memoir which by the accuracy of its descriptions, the carefulness of its comparisons, and the excellence of its figures, made an epoch in the history of our knowledge of the bony framework, not only of the chimpanzee, but of all the anthropoïd apes." Twenty-eight years afterwards, the series is complete, and the quarto volume of thirty-one pages and thirteen magnificent lithographic plates, which form the seventh and concluding part, is now before us. We shall extract a few of the more interesting passages, bearing upon the differences between the structure of man and the ape.

The proportions of the anterior extremity in the gorilla are here given in the greatest detail, and minute comparisons are given of the various separate bones. As regards the hinder extremity, Professor Owen says:

"The iliac portion of the os innominatum shows in the human species alone that degree of expansion and forward inflexion of its upper and anterior border occasioning the form that suggested the term *pelvis* or basin for the segment of the skeleton composed of the ossa innominata and sacrum. Every ape, until the gorilla became known to the anatomist, had presented an iliac bone, not only long and narrow, but flat or, if hollow, with the cavity directed backwards instead of forwards. Such is the strictly quadrumanous condition of the bone in the common chimpanzee (*Troglodytes niger*) as well as in the orang-utans and gibbons. In the gorilla the iliac bone, besides showing a greater relative breadth in proportion to its length than in the chimpanzee, has the upper and outer border a little bent forward, giving a moderate concavity or pelvic character to that part of the skeleton; it is, however, much inferior in degree to the human pelvis. The difference of size between the *os innominatum* of the gorilla and that of man is enormous; this part of the great ape's frame would fit a human giant of ten feet in height. But besides size, there are well marked differences in form and proportion."

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* "Osteological Contributions to the Natural History of the Anthropoid Apes." No. VII. Comparison of the Bones of the Limbs of the *Troglodytes Gorilla*, *Troglodytes niger*, and of different varieties of the Human Race; and on the general character of the skeleton of the Gorilla. By Professor Owen, F.R.S., F.Z.S., etc. —*Transactions of the Zoological Society*, 1862.

† *Man's Place in Nature*, p. 20.

Like comparison is made of the femur.

"In man the tibia, after the femur, is the longest bone of the skeleton; but in the gorilla the tibia is the shortest of all the long bones of the limbs, being barely two-thirds the length of the humerus. It is nearly one-fifth shorter than the human tibia, but is of equal thickness in the shaft, and of greater thickness at the upper end."

The analysis of the differences in the feet is entered into in detail.

"The chief departure from the human type of foot . . . is the angle at which the innermost toe in the gorilla articulates with the tarsus; whereby it becomes an opposable thumb, as in other *Quadrumana*. In the orang-utan the foot is longer than the leg; in the gorilla it is nearly as long; in man it is shorter; thus the length of the tibia in a man being sixteen inches, that of the foot bones is ten inches; whilst in the gorilla, the length of the tibia being twelve inches and a half, that of the foot is twelve inches. The foot is so articulated with the leg in the gorilla that the sole is turned a little inward; the concavity of the sole lengthwise is greater than in man by reason of the permanent partial flexure of the toes, the disposition of the articular ligaments being such as to oppose some force to the attempt to press the toes into a straight line, such as they generally present in man. The transverse arch or concavity is less deep across the tarsometatarsal joints than in man. The tarsus is shorter in proportion to the foot, and is broader than in man. There is less inequality in respect of thickness between the hallux and the other digits, and greater inequality in respect of length than in man; above all, the innermost digit, by express modification of size and shape of the entocuneiform, is set at nearly a right angle to the other toes, converting the foot into a hand, and one gifted with a prodigious power of grasp."

Entering into detail, Professor Owen says of the entocuneiform:

"The entocuneiform of the gorilla differs chiefly in the form and shape of the surface for the metatarsal of the hallux; in man this surface is nearly flat, and forms or covers the forepart of the bone, presenting there a reniform figure; in the gorilla, the surface is convex transversely, curving from the fore to the inner side of the bone, and forming almost the anterior half of that side. The outer (fibular) third of the forepart of the entocuneiform is rough or nonarticular, and encroaches by a notch upon that border of the articular surface. The navicular surface is concave, and continuous with a narrow vertical tract for the entocuneiform. A second surface for the same bone is afforded by the posterior facet of an articular surface on the upper and outer part of the entocuneiform, the anterior facet of which articulates with the base of the second metatarsal."

As regards this latter, Professor Owen remarks:

"The metatarsal of the hallux in the gorilla shows a corresponding modification to that of the entocuneiform in regard to the shape and direction of its proximal articular surface, which is concave from side to side, and looks obliquely backward and a little outward, affording a favourable position and much freedom of motion of the innermost toe, as a flexible prehensile thumb of much power. The whole metatarsal is shorter and more slender than in man; the distal articular surface is more convex and bent down."

Professor Owen sums up his retrospect of the pedal modifications of the gorilla as follows.

"In all the characters by which the bones of the foot depart in the gorilla from the human type, those of the chimpanzee recede in a greater degree, the foot being in that smaller ape better adapted for grasping and climbing, and less adapted for occasional upright posture and motion upon the lower limbs. The lever of the heel is relatively shorter and more slender, the hallux has still more slender proportions, and the whole foot is narrower in proportion to its length, more curved towards the planta, and more inverted, than in the chimpanzee."

In the description of two beautifully lithographed plates from the photographs taken by Mr. Fenton from the specimens in the British Museum collection, Professor Owen enters in detail into the relative proportions of trunk and limbs in the gorilla. He says:

"The trunk of the gorilla, according to the human standard, would represent that of a giant of some eight feet in height, and the jaws and upper limbs have a proportional or corresponding magnitude; but the size of the constituent bones is such as to exhibit, in this part of the skeleton, much greater breadth, strength, and massiveness than is present in the Irish Giant of that height in the Museum of the Royal College of Surgeons. The upper extremities, though so long in respect of the whole body, bear to the trunk nearly the same proportions as in Man. Take away the lower limbs in both skeletons, and this similarity becomes more obvious. In both the lower ends of the antibrachial bones, as the arm hangs down, reach the same transverse line as the ischial tuberosities; and they ascend scarcely an inch below those parts in the chimpanzee. The embryonal proportions of the lower limbs bring down the stature of the gorilla below that of the average in the well-formed European. In a skeleton of such, measuring five feet nine inches from the vertex to the sole, the length of the trunk is two feet six inches; in the skeleton of a male gorilla, measuring five feet six inches, in as erect a position as it can naturally be brought, the length of the trunk is three feet. From the vertex to the ischial tuberosities in the man measures three feet; in the gorilla it measures only three feet five inches, owing to the inferior height of the cranium, even with the parietal crest fully developed. The similarity of proportion of the upper limb to the trunk in length is due mainly to the greater proportional length of the pelvis in the gorilla. The humerus in man extends as low as the interspace between the third and fourth lumbar vertebræ; in the gorilla it extends to that between the vertebræ answering to the fourth and fifth lumbars, but in man the humeral condyles hang nearly two inches above the iliac labrum, while in the gorilla they extend as far below that labrum. The tips of the fingers in man, when he stands erect, usually reach to the middle of the femora; in the gorilla they reach to about an inch from the lower end. The length of the bones of the upper limb in the human skeleton is two feet nine inches; in the gorilla it is three feet eight inches; in the Irish Giant it is three feet two inches and a half. The lower limbs, measured from the head of the femur to the under surface of the calcaneum, rather exceed in length those of the head and trunk together in man; in the gorilla they are nearly one foot shorter.

	Man . . 5 ft.	9 in.	Gorilla . . 5 ft.	6 in.
Length of head and trunk	3	0	3	5
Length of lower limb	3	1	2	6

"The shorter lower limb of the gorilla is terminated by a longer foot than in man; the bony frame of that part measures twelve inches in length in the gorilla, and nine inches and a half in the human skeleton compared. The bony hand of the gorilla is ten inches in length; in the man it is seven inches and one-third.

"I would remark that whilst the bony frame of the gorilla shows the nearest approaches amongst apes to the truly human characteristics of the skeleton, it differs in a greater degree than does that of lower Quadrumana by its adaptive developments. These differences relate to the great bodily strength and power of bite of the gorilla, and do not approximate it to any lower form, assuredly not to the baboons with their short and narrow thorax, long and narrow pelvis, long loins, with anapophysially interlocked vertebræ, and short-spined neck-bones."

As regards the skeletal variations in the different races of mankind, Professor Owen says—

"In these illustrations of the comparative osteology of the European and Australian, the physical superiority of the civilized man is exemplified. No known conditions of climate are more favourable to a perfect natural development of the 'noble savage in his native wilds,' free from all the restraints of so-called 'artificial' society, than that of Australia. The wild mammals of the woods and plains, and the teeming life of the sea, excite and reward the healthy exercise of the senses and muscular system of the aboriginal sportsman of that dry, sunny, and healthful land. Yet the advantage in regard to size and strength of body, especially as exemplified by the bony framework, is decidedly with the civilized European."